



## **Summary of Fishery Surveys**

### **Swamp Lake, Flambeau River State Forest, Sawyer County, 2016**

WDNR's Fisheries Management Team from Park Falls completed an angling survey in mid-June 2016 to assess the fish community in Swamp Lake, where any fishery is presumed to be unexploited due to difficult angling access and/or recurrent winterkill losses. Quality, preferred, and memorable sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is our own description applied to bluegill  $\geq 7$  inches long and black crappie  $\geq 9$  inches long, based on known angler behavior.

### **Survey Effort**

Beginning at 10:30 a.m. on June 14, 2016, two experienced anglers fished from a canoe on Swamp Lake for 3.0 hours (6.0 hours of angling effort). One focused solely on largemouth bass and the other targeted panfish and largemouth bass simultaneously, directing 2.25 angler-hours toward panfish. They used spinning tackle with plastic or rubber baits for largemouth bass and a small jig baited with a night crawler for panfish. All fish landed were immediately measured and released. The sky was overcast and air temperatures were in the high 60's. Water temperature was not recorded, but the angling survey should have occurred within the three-week period when largemouth, bluegills, and other sunfishes typically spawn in northern Wisconsin lakes.

### **Habitat, Water Quality, and Access Characteristics**

Designated as a "wilderness lake," 249-acre Swamp Lake is a soft water, slightly acidic lake, remotely located within the boundaries of the Flambeau River State Forest about 16 miles northwest of Phillips, WI. A narrow outlet stream drains to Mason Lake and then to the Flambeau River. Maximum depth is 8 feet, average depth is 6 feet, and only 6% of the surface area has depth  $\leq 3$  feet. Muck covers the entire lakebed. Water clarity is low (Secchi depth = 2 feet) due to dark-colored staining by dissolved humic compounds, and consequently rooted submergent vegetation is sparse around the entire shoreline. Black spruce and black ash swamps with pockets of white cedar cover 70% of the shorelands, and the remainder is upland forest with absolutely no human development. In 2010 Swamp Lake and its surrounding wetlands and forests were designated as the 1,042-acre Swamp Lake State Natural Area. The natural area includes the largest stand of hemlock-hardwood forest and one of few significant stands of older forest remaining in the Flambeau River State Forest. Primitive, walk-in-only angling access and carry-in-only boat access are available to those capable and adventurous enough to follow the abandoned ¼-mile logging trail that begins about 15 feet in front of the gate at the end of Tower Hill Road. The unimproved trail was marked with orange flagging, but not with permanent route markers. The path crosses through upland forest most of the way, but the last 150 yards cross through swamp to reach the lakeshore. The walk takes about 10 minutes.

## Summary of Results

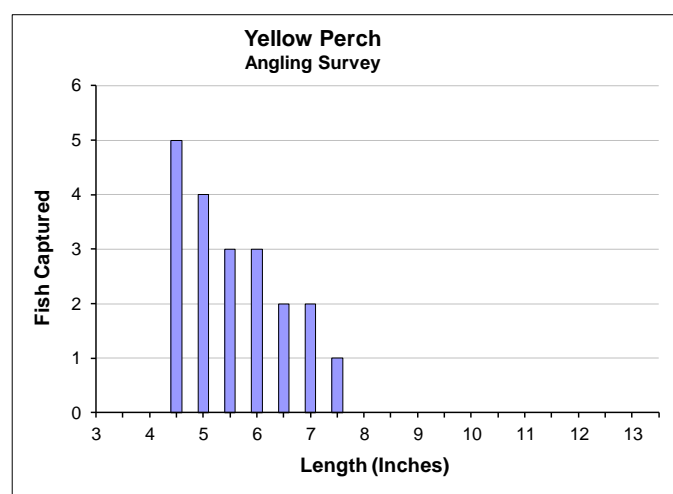
With no drive-up boat access and difficult walk-in access our survey options were limited to using gear that we could carry, so we do not expect that our angling survey resulted in an exhaustive list of fish species that might be detected in Swamp Lake had we been able to use our traditional sampling methods (netting and electrofishing). Nonetheless, a substantial angling effort captured only 20 yellow perch 4.5–7.5 inches long and three gravid pumpkinseeds 4.5–4.9 inches long. No largemouth bass or other fish species were captured, hooked but not landed, or seen. Our survey results mirrored the catch of two State Forest staff members who fished the same angling effort on Swamp Lake about three weeks earlier. They caught many perch  $\leq 6$  inches (about 7 per hour), one 9-inch perch, and no gamefish.

### Yellow Perch



#### Angling

Captured 6.7 per hour $\geq 5"$	
Quality Size $\geq 8"$	0%
Preferred Size $\geq 10"$	0%
Memorable Size $\geq 12"$	0%



We suspect that Swamp Lake's fish community composition is strongly influenced by chronic winterkill—mortality that occurs when decomposing organic material depletes dissolved oxygen to lethal concentrations in ice-covered waters, especially in shallow, eutrophic lakes with high biological productivity. Perch, pumpkinseeds, and bullheads seem to tolerate very low dissolved oxygen concentrations better and survive longer under those stressful conditions than many other fish. Survivors that can find suitable refuge tend to quickly recolonize the lake and reestablish a struggling population which can persist until the next severe winterkill occurs.

Dissolved oxygen measurements support our suspicion that winterkill occurs at least occasionally or often. Oxygen concentrations at 1-foot intervals 2 – 6 feet deep were 8.3, 3.6, 1.4, 0.61, and 0.60 milligrams per liter (mg/l) on February 1, 2017. An influx of oxygenated runoff in a late winter warm spell helped dissolved oxygen levels rebound to 1.0 mg/l at the 3 – 5 depth intervals on March 7, 2017.

Based on the species, sizes, and numbers we encountered, it appears that these hardy fish populations in shallow, eutrophic Swamp Lake endure an endless cycle of winterkill loss followed by partial recovery. Apparently, winterkill is too severe and too frequent to allow the perch population a chance to produce enough fish in the sizes anglers want. For the same reasons, largemouth bass, northern pike, and other less tolerant species have no opportunity to (re)colonize, let alone thrive. Consequently, the prospects for any sustainable fishery in Swamp Lake look bleak. With no shoreline or watershed disturbances, recurring winterkills here are driven by natural factors, rather than man-made causes. Any attempts to

mitigate winterkill by lake aeration, or to establish and maintain a fishery by stocking, would be infeasible and futile. Despite its low potential as a recreational fishery, Swamp Lake supports many uses by other aquatic life, including waterfowl, furbearers, reptiles, amphibians, and invertebrates.

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STATE OF WISCONSIN  
DEPARTMENT OF NATURAL RESOURCES

LAKE SURVEY MAP

SWAMP  
LAKE

SAWYER  
COUNTY

SEC. 1, 2, 11, 12 T. 38 N. R. 3 W.

